MONTHLY WEATHER REVIEW,

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WAR DEPARTMENT,

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DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

The current REVIEW is made up from meteorological returns from the following sources: 94 U. S. Signal Service Stations; 49 Surgeons, U. S. A; 1 Naval Hospital; 13 Canadian Meteorological Service and 271 Voluntary Observers, together with material obtained from marine log-books, shipping news and other press-reports. The chief features of the meteorology of October are—

First. The low mean temperature of the month, which, as will be seen under the appropriate heading, has been universally below the normal October temperature, except on the Pacific coast. Owing to this low temperature unusually early and destructive frosts occurred in most of the Southern States, and early and heavy snows in the northern and lake districts.

Second. The number and severity of general and local storms is also another marked characteristic. The local storms have been in many cases destructive to property. The frequency and force of the general storms rendered necessary the largest number of Cautionary Signals ever displayed in any one month by the Signal Service.

ATMOSPHERIC PRESSURE.

The region over which the barometer has stood highest during the month, will be seen from the isobaric lines (in black) on Chart No. II, to be the Gulf States and Tennessee. The area over which the pressure has been lowest, embraces Lakes Superior and Huron and the country eastward to the province of Quebec. The highest mean pressures for October, reported from stations, are 30.15 inches at Shreveport, La., and 30 19 at Vicksburg. The lowest mean pressure is 29.84 at Alpena on Lake Huron. This geographical distribution of pressure is normal for the month of October.

(1.) *Areas of High Barometer.*—As usual, the high pressure areas, which have traversed the territory of the United States, have entered the field of observation from the Northwestern and Western sections, and have advanced quite rapidly until reaching the Gulf or Atlantic States, where their progression has been comparatively slow. These areas of high barometer have been attended, by fresh or high northwest winds and by low temperatures, producing frequent and severe frosts, and, in the latter part of the month, frequent snows in the northern and lake sections of the country. They have also been preceded on the Atlantic and western Gulf coasts by high and dangerous winds.

I. The first prominent area of high pressure was reported, on the 1st of October, in Kansas and the Indian Territory, and moved slowly eastward, with increasing pressure.

On the morning of the 2d it was central in Tennessee, with a pressure of 30.32 inches, and thence developed in a direction slightly north of east, reaching the middle Atlantic coast on the evening of the 2d, with still increasing pressure, and on the morning of the 3d the barometer rose to 30 57 in Virginia, with low temperature and frequent frosts. From Virginia it moved slowly eastward off the Atlantic coast, and thence southeastwardly.

II. The second high pressure area began its eastward progress on the 4th, with less marked features. It, too, moved slowly in an easterly direction from the Northwest to the St. Lawrence valley, which, by tardy advances, but with steadily rising barometer, it reached on the 6th. The barometer rose on that day to 30.55 inches at Cape Breton and northward. Considerable quantities of rain fell on the New England coast on the 6th and 7th, which was partly due to the pressure northward of this area.

III. On the 6th a third and similar area was reported from Kansas and the mid-Mississippi valley, which also moved very slowly in a direction nearly due east, until the evening of the 7th, when it was deflected southward toward Mississippi.

IV. On the 8th still another high barometer began to move from the Northwest and to slowly overspread the Lake region, from which, on the morning of the 9th, it passed east, and became central in northern Pennsylvania, and thence moved off the Atlantic coast.

V. A fifth, but more decided area, followed this from the Northwest on the 10th, progressing southeastwardly and, by its low temperature, causing light snow in the Upper Lake region on the 11th. This area moved slowly and southwardly on the 11th, the pressure meantime increasing to 30.52 inches at St. Louis, where it was central on the morning of the 12th. From eastern Missouri it altered its course and advanced nearly due east into Pennsylvania and Maryland, disappearing on the 13th off the New Jersey and New England coasts.

VI No other very decided area of high pressure was reported after the last mentioned until the 17th, when a small but well-defined area (pressure 30.48 inches) moved from Dakota into the central Mississippi valley, reaching the latter section on the afternoon of the 18th. From this region it progressed southeastwardly into Tennessee, and thence on the 19th and 20th, by very slow stages, into the Gulf and South Atlantic States.

VII. The last high barometer of October, followed storm-centre No. IX, on the 29th. This area developed in the Northwest, and rapidly overspread the whole country west of the Mississippi river causing dangerous local storms in the lower Mississippi valley, on the 29th and a severe "norther" on the Texas coast, October 30. Although the barometer did not rise so high as in some of the other areas of this kind, the extent of the high pressure area was very great, the area expanding on the 30th and 31st over the whole country south of the lakes, while, however, it remained central in the lower Mississippi valley.

(2.) *Areas of Low Barometer.*—The number of well-defined and decided storms of October has largely exceeded that of the previous months. Ten such decided depressions are traced on Chart No I. It is an observable fact that the origin of none of these can be traced to the Southern or Gulf districts, but they all seem to have been generated on the eastern slopes of the Rocky Mountains, excepting alone that marked as No. V, which came from the West Indies. It is also noticeable that nearly all the month's storms passed over or within a short distance of the Lower Lake region, and thence

progressed northeastwardly. All the storm-centres also, which were formed in or approached from the Northwest and Upper Lake region, first moved southeastwardly to the Lower Lakes before they curved to the northeastward. Of these disturbances, No. VIII, No. IX and its offshoot No. X, were the most severe and dangerous that occurred.

No. I began its observed progress from the upper valley of the Missouri—lat. 46° N., long. 102° W.—on the morning of October 2d, and moved slowly southeast until reaching central Iowa, when, with accelerated motion, it pursued a direct easterly course toward Long Island, near and off which it passed on the 5th; the depression assuming a trough-shape lying east and west. It was attended by no very high winds, but by an extensive rain-belt over the Lakes, New England and the St. Lawrence valley. Its velocity varied from 15 to 20 miles per hour.

No. II is first traced on the map in northern Kansas on the afternoon of the 4th, whence, with a gentle deflection to the south, until it had crossed the Mississippi river, its track was northeasterly to Nova Scotia. The average rate of its easterly progression was about twenty miles an hour. As it neared the Lake region from the north on the 6th, it caused high winds and heavy rains on the Lower Lakes, and also rain, with high, and dangerous onshore winds along the Middle Atlantic coast. On the morning of the 7th, when it reached New England, it occasioned further heavy rains and dangerous easterly coast-winds.

No. III. This depression originated northwest of Dakota on the 8th, and is clearly discernible on the morning map of the 9th. Its path lay mostly on or beyond the northern frontiers of the United States, and its history is of no special interest.

No. IV was very similar to its predecessor in the track it pursued, except that it was deflected unusually far south into the States of New York and New Jersey. This storm-centre was, also, first seen in the Northwest; having, doubtless, been generated on the eastern slopes of the Rocky Mountains, near the parallel of 50° N. It approached the Middle Atlantic coast on the 15th, at the same time that No. V, another depression, but from the West Indies, was advancing northward on a line parallel with the same coast. The two depressions were very near each other on the evening of the 15th—*i. e.*, within 225 miles. They did not, however, coalesce, but preserved their individuality, No. V taking the lead and No. IV slowly following. The latter advanced on the 16th from the Jersey coast to Maine, followed by high winds at and south of Sandy Hook. On the night of the 16th, it moved rapidly to the lower St. Lawrence valley, still followed by dangerous winds in that valley and on the New England coast. The velocity of the winds on the night of the 16th rose as high as 48 miles at Sandy Hook.

No. V, being a West Indian cyclone, moving upon the Gulf stream, is traced with difficulty, and the track marked for it on Chart No. I is, of course, only approximate. Its track and progression, up to midnight of the 14th, is roughly deduced from a few marine logs; but the afternoon reports of the 14th led to the belief, and the midnight reports of that day confirmed it, that a hurricane was advancing northward, between Bermuda and the American coast. After the 14th, its presence and direction were rendered unmistakeable, although the longitude of its track could not be accurately determined. The following shipping notes furnish various clues to its course:

"Brig Nellie Antrim, October 13th, damaged by a northwest gale off Cape Fear.
"Schooner Lillie Taylor, on the 12th, encountered heavy northeast weather.
"Brig Lady Mary, October 15th, off Hatteras, had heavy gales from east-southeast, lasting 14 hours.
"Schooner Tampico encountered heavy northeast gales, October 13th, in lat. 30° N., long. 77° 50′ W.
"Schooner J. B. Marshall had heavy gales, October 14th, in lat. 44° 20′, (?) long. 76° 03′ W.
"Schooner E. E. Ruckett, from the Bahamas, encountered hurricane on 14th. (No location given.)
"Schooner Hazh, October 13th, in straits of Florida, had heavy gale from north-northeast."

No. VI. This storm's track crossed the Lake region, the depression passing off the coast of Massachusetts on the 18th. It was of no special importance; the only noteworthy circumstance attending it was, that instead of increasing in violence as it neared the Atlantic coast, as such storms generally do, its central depression became nearly filled up in Massachusetts, and when it left the coast, going east, it was scarcely descernible.

No. VII also traversed the Lake region; it was somewhat elongated from west to east, moving slowly, attended by no very high winds, and, also, like its predecessor, filled up and obliterated just before it reached the coast of Massachusetts.

No. VIII. This storm was of a very decided and dangerous character, and had not its path, in its earlier stages, been so distinctly northerly, its progress might have been very disastrous on the Atlantic coast It first becomes conspicuous on the map of October 25th—7:35 A. M —in eastern Kansas, and thence its movement was to Lake Superior, which it crossed on the evening of the 25th, to pursue an east-northeast route towards Labrador. As it neared Lake Superior, it occasioned high and dangerous winds, especially on that lake, but also on Lakes Michigan and Huron, and these high winds followed it after it had curved to the eastward. Wind-velocities of from 34 to 44 miles per hour were reported from the Upper Lakes, and heavy snow and rain occasionally attended them As the storm-centre entered the lower St. Lawrence valley, its indraught produced high winds on the coast of Maine, the wind reaching a velocity of 54 miles an hour at Eastport, Me., on the morning of the 27th.

No. IX. This storm was of more than usual interest and importance. Its first distinct appearance was reported on the morning of the 28th, then in southwestern Kansas, whence it shaped its course in a line due northeast to the lower St. Lawrence valley. Its velocity varied from twenty to twenty-five miles per hour, although its earlier progress was slow. It followed very close upon No. VIII, and exceeded that disturbance in the extent and destructiveness of its cyclonic winds. The cloud-area attending it, on the morning of the 28th, was inconsiderable, although its existence in Kansas gave rise to cloudy weather over the Upper Lakes. On Thursday, midnight, (the 28th,) its centre had advanced to Missouri, and was then nearing the Mississippi valley. On the morning of the 29th, the barometer hae fallen to 29.50, and by 4:35 p. m., to 29.38, occasioning fresh and rising easterly winds on the Lower Lakes. As it passed over southern Lake Michigan, on the night of the 29th, heavy rains fell, and the wind rose to a gale on Lakes Michigan and Erie. By the morning of the 30th, the pressure had fallen to 29.27, or less, on Lake Huron, and the winds on Lakes Michigan, Huron and Erie rose proportionately. The gale was now moving along the St. Lawrence valley, and as it passed north of Lake Erie, about noon of the 30th, an offshoot-depression of about 29.50 inches was formed and moved rapidly southeast into central Pennsylvania, and was reported at 4:35 p. m., as a little west of Philadelphia. The original storm-centre continued its course northeastwardly without deviation, and passed away on the night of the 30th towards the Gulf of St. Lawrence. Frequent and considerable snows fell on the northern and western sides of the storm as it moved forward.

No. X, which was an offshoot from No. IX, after rapidly progressing to eastern Pennsylvania, soon became a severe gale, and began to move directly up the Atlantic coast towards Maine. Its path was marked by heavy rains and high winds; and considerable snow followed its progress through New England and northeastward to Newfoundland. The local storms to which this depression gave rise, are, in part, referred to under the head of *Local Storms*.

(3.) *Local Storms.*—In Harford county, Md., on the 6th, at 3:45 p. m., a very severe

storm, preceded by roaring noise, some time before any agitation of the air, took place at the point of observation. As the storm approached a little island in the Chesapeake Bay, fifteen miles distant from where it was first seen, it is reported to have occasioned a small water-spout. On the 26th, in the same county, a severe storm, with lightning, was observed. At Fort Wayne, Ind., on the 29th, at 11 a. m., there was a local storm, with great darkness, frequent flashes of lightning and heavy thunder, followed by rain. Forty miles north of Fort Wayne, the same storm took the form of a tornado, striking Goshen and the surrounding country, demolishing a large barn and blowing out-buildings completely away. At 12 o'clock of that night, it struck Angola, Ind., blowing the engine-house of the Fort Wayne, Jackson & Saginaw Railroad to the ground, and also inflicting much other damage. A severe thunder-storm visited Boston on the morning of the 27th, having passed over Springfield, Mass., on the previous evening. The wind subsequently rose to forty-two miles an hour in Boston harbor. A gale, accompanied by heavy rain, swept over Louisville at 11 p. m., of the 29th. At Vicksburg, on the 29th, at 11:45 p. m., a violent storm of wind, rain and hail struck the city from the northwest, the wind-velocity reaching sixty miles an hour. This same storm, on the 29th, passed over Memphis at 9:30 p. m., with vivid lightning and heavy thunder and rain. It also passed over St Louis, same day, at an earlier hour, about 4:43 p. m., with intense zig-zag lightning, followed by a wind blowing fifty miles an hour and half an inch of rain, and inflicting much damage on buildings. Its effect was felt at Shreveport, La., at 8:50 p. m., of the 29th, in a thunder-shower; and, at New Orleans, at 4:05 a. m., of the 30th, in a heavy shower of rain, with brisk winds, thunder and lightning. The local storms of the 29th and 30th, were evidently due to the cold northwest winds, descending the Mississippi valley, and following behind the storm-centre No. IX.

TEMPERATURE OF THE AIR.

The isothermal lines on Chart No. II show the mean distribution of temperature for October. From the tabular exhibit in the lower left-hand corner of this chart, it is seen that the October temperature has with very remarkable uniformity been below the usual average, in all sections of the country east of the Rocky mountains. This early and unusual cold weather has been most marked in the South Atlantic States and the Upper Lake region, and also in the St. Lawrence valley. This low mean temperature in the South Atlantic States, may perhaps be explained by the presence of the mean high barometer in the lower Mississippi valley, which is seen on Chart No. II. In the lower Missouri valley the temperature has most nearly conformed to the normal. On the Pacific coast the temperature has been nearly three degrees higher than usual.

The following maximum temperatures were reported: Dodge City, Kansas, 88°; Indianola, Texas, 89°; Shreveport, La., 85°; Galveston, Texas, 84°; Breckenridge, Minn., 84°. Among the minimum temperatures, are—Breckenridge, 15°; Cheyenne, 11°; Pike's Peak, —5°; Colorado Springs, 18°; Yankton, 18°; North Platte, 18°; Bismarck, D. T., 21°. The greatest ranges are at Yankton, 69°; Colorado Springs, 64°; Breckenridge, 71°.

Frosts were observed at Huntsville, Ala., on the 12th, 30th and 31st; Jackson, Miss., 13th and 14th; Wilsonville, Ala., 13th and 14th, and killing frost on the 16th; Mt. Ida, Ark., and Forsyth, Ga., 2d, and killing frost at the latter place on the 17th; Atlanta, Ga., 13th; Gainesville, Ga., killing frost on the 3d; Fayette, Miss., 19th, 20th, 27th and 31st; Las Vegas, New Mexico, 15; Weldon, N. C., 3d, 13th and 18th; Attaway Hill, N. C., 3d, 13th and 17th; Greenville, S. C., 13th, 19th and 20th; Aiken, S. C., 13th; Spartanburg, S. C., 2d, 3d and 13th; Edgefield C. H., 13th and 17th; Powhatan Hill and Lynch-